one side than the other. That the protrusion of roots on one side had nothing to do with eccentricity, was also clear from the fact that he had examined Symphoria, Wistaria, and many other things with rooting, creeping branches on the ground, in all of which the wood was perfectly concentric.

Notes on two Traps; A Case of Alteration of Earthy Sediments.—Prof. PERSIFOR FRAZER, Jr., remarked, that, at a previous meeting of the Academy the occurrence of a vein of quartz in a mass of dolerite had been described. The specimen has been since cut in two by a lapidary in such a manner as to illustrate (1) the central band of quartz (part of which appears to be hyaline and part anhydrous) inclosing numerous small fragments of the adjoining dolerite. (2) Two bands of darker color than the mass of the latter, which appear to form the boundary walls between the vein and the dyke which it intersects. (3) A broad margin of unaltered dolerite on either side. This specimen is presented for the inspection of the Academy.

The whole subject of the origin and true nature of "traps," and the means of distinguishing those which have been cooled from a molten mass from those which are indurated, baked, or altered to crystalline rocks from earthy sediments by the proximity of sources of heat, is one yet involved in much obscurity. I have here a specimen of what appears to be a baked sandstone belonging to the New Red Formation, in which a part of the mass, occupying an irregular space in one of its ends, has become a coarsely crystallized syenite. The specimen was obtained from near Harman's blacksmith shop, in the northern and western part of York County.

Notes on some Palæozoic Limestones.—Prof. PERSIFOR FRAZER, Jr., remarked that among the many interesting chemical problems connected with geology is that of the relation of a percentage of magnesia to the mode of formation and age of the limestones of the world. Not only have some very interesting speculations been made as to the condition of the earth's crust during the production of dolomites (see T. S. Hunt's Chemical and Geological Essays), but it is easy to see that the subject is capable of very large development.

One of the lines of investigation chief in importance is the influence which dolomitic limestone must exercise on the topography of a country. Prof. Lesley has shown that the grand effects of erosion can be explained by the slow solution and destruction of the limestones of the earth below water level, with the consequent caving in of the strata which rest on them.

It is easy to see that different kinds of effects would be produced by the rapid waste of pure carbonate of lime and the slower destruction of magnesian or dolomitic rocks. And the result of

the honeycombing of either of them singly would not resemble that of their combination in separate layers or benches in the manner in which they are so frequently found associated in the great valleys of Silurian and pre-Silurian rocks on the Atlantic border.

As these limestones of the Cumberland and York valleys are more thoroughly investigated, the heterogeneous character of the layers which compose them will be much more clearly evident.

It has been sought to ascertain the horizon of a given stratum in these measures by ascertaining its percentage of magnesia, and, indeed, were any such test reliable, it would be of the greatest importance for the stratigraphical geologist.

With the purpose of submitting to this test as many of the limestones as possible, a selection was made of representatives of the principal beds, whose place in the series has been established by the party of York and Adams. Their names are as follows:—

No. 1 is a sandy limestone from the west branch of Creitz's Creek, in the town of Wrightsville. If the interpretation of the structure given in the Report of Progress of the Party of York and Adams for 1874 is correct, this limestone belongs at or near the base of the "Auroral" series, and immediately upon the chlorite and hydro-mica schists.

No. 2 is a specimen taken from the upper bench of a quarry near Pine Grove Furnace, Cumberland County. It probably represents one of the higher beds of the "Auroral." Upon it was found crystallized calcite containing over 98 per cent. of $Ca'' Co_3$, with hardly a trace of magnesia.

No. 3 is a specimen taken from a lower bench (perhaps 25 feet perpendicular to the measures) of the same quarry.

No. 4 is an example of the white or buff-colored limestones which occur together with the blue limestones often in the same quarry, but, nevertheless, usually exhibiting indications of unconformability with them. These limestones are usually poor in magnesia.

No. 5 is taken from Detweiler's quarry, north of the Columbia Bridge, in Wrightsville. Its position is in all probability midway between the upper and lower benches of the auroral limestone.

No. 6 is taken from Detweiler's quarry, south of Wrightsville, and is (as its analysis shows) a calcareous slate underlying one of the many belts of the formation.

The limestone slates which occur with this one in the foot of the quarry are remarkable for the very large amount of pyrite crystals which they contain. Some of these crystals are half an inch on one edge.

The specific gravity was determined with care.

For this determination the specific gravity bottle was not employed, its mission being considered rather to obtain the density of chemically homogeneous compounds. For determinations of the specific gravity of rocks, coals, etc. etc., whose weight becomes

an important item in their transportation for the great industries, it was believed that the weight of a given bulk could be more accurately determined without taking especial care to exclude the air with which they are partly filled.

ANALYSIS OF LIMESTONES.

Constituents.	Sandy limestone, west branch of Creitz's Creek. No. 1.	Pine Grove Quarry, upper bench. No. 2.	Pine Grove Quarry, lower bench. No. 3.	White limestone, 100 yards east of Beller's Cross-roads. No. 4.	Detweiler's Quarry, west of Wrightsville. No. 5.	Detweiler's Quarry, South of Wrightsville. No. 6.
Specific gravity (in lump) .	2.832	2.735	2.731	2.750	2.737	2.770
Insoluble siliceous residue .	4.400	12.270	12.000	3.570	0.490	41.710
Alumina and ferric oxide .	1.170	1.540	0.450	0.210	1.440	6.350
Carbonate of lime . . .	[1]49.920	[2]75.320	81.617	[3]91.580	91.400	43.728
Carbonate of magnesia . .	[1]42.980	10.750	6.400	[4]4.110	7.290	6.450
Sulphur	0.220	0.120	0.422	0.113	0.003	1.480
Sum	98.690	100.000	100.489	99.583	100.623	99.718
Undetermined and loss . .	1.31	....	....	....	....	0.282
Excess	....	...	0.489	0.417	0.623	....
Metallic iron	0.354	0.698	....	....	0.196	1.827
Alumina.	0.505	0.541	....	....	1.454	3.740

Determinations of the carbonate of lime and magnesia in these rocks were made independently by Mr. D. McCreath, and are as follows:—

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Calcium carbonate . . .	49.92	73.60	86.39	91.67	91.25	44.50
Magnesium carbonate . .	42.98	10.98	6.42	4.11	7.58	8.56
Silica	....	....	....	....	0.760	[5]
Some sesquioxide. . . .	....	....	....	....	0.196	....

The author is indebted to Dr. Cresson for his courtesy in offering him the facilities of his laboratory for this investigation.

As a supplement to this table the following, taken from p. 113

[1] Determined by Mr. David McCreath.
[2] By loss. 73.6 as determined directly by Mr. D. McCreath.
[3] Mean of two determinations.
[4] Determined by Mr. D. McCreath.
[5] Some sulphide is present, as sulphydric acid is produced when the rock is treated with hydrochloric acid.

of my Report of Progress in the District of York and Adams for 1874.[1]

Limestones.

7. New Red S. S. near Dillsburg, foot of MacWilliams slope.
8. Opposite Allison's Mill, Xenia P. O., York Co.
9. From Shaft No. 5, ¾ mile east from Mont Alto Furnace.
10. Half a mile south of Seitzland, in a cutting of the N. C. R. R. (A calcite very similar to that above described as occurring on the upper bench of the Pine Grove Quarry is found here.)

	VII.	VIII.	IX.	X.
Calcium carbonate	73.18	62.35	77.89	93.87
Magnesium carbonate	4.37	6.32	2.83	0.96
Metallic iron	0.52	5.27	1.33	0.30
Insoluble siliceous residue	21.50	20.06	15.89	4.30
Sum	99.57	94.00	97.94	99.43
Oxygen, organic matter, water, and loss	0.43	6.00	2.06	6.57

April 18.

The President, Dr. Ruschenberger, in the chair.

Forty-four members present.

On the Geologic Age of the Vertebrate Fauna of the Eocene of New Mexico.—Prof. Cope presented a synopsis of the species described from the Eocene of New Mexico, arranged in the following manner:—

Mammalia	..	54
Perissodactyla	10	
Amblypoda	9	
Pantodonta	9	
Incertæ sedis	3	
Quadrumana	10	
Prosimiæ	10	
Rodentia	3	
Insectivora	19	
Tæniodonta	4	
Bestiæ	2	
Creodonta	13	
Aves	..	1

[1] These analyses were made by Mr. A. S. McCreath, Chemist of the 2d Geological Survey of Pennsylvania.